

I want my own solar system!

solar thermal

What is solar thermal energy?

Solar thermal technologies use sunlight to provide heat for domestic hot water, space heating, industrial process heat and heating swimming pools. Solar thermal systems generally fall into two categories: passive solar design, which allows heat from the sun to be absorbed and stored by building components (like concrete or stone surfaces) and active systems, which use collectors and mechanical components to provide thermal energy to a building. Solar thermal systems are meant to supplement a building's hot water and space heating systems; they are not intended to replace them.

Is solar thermal energy effective in Minnesota?

Solar energy is plentiful in Minnesota. For example, a typical solar water heating system in Minnesota can provide 50 to 75% of the total energy required for domestic hot water. Space heating requires a larger system, but is effective in significantly reducing a building's need for other energy resources like natural gas, fuel oil, or propane. Space heating can be achieved with solar hot water or solar air heat collectors (which use solar radiation to heat air inside the collector and transfer warm air into the interior space). Minnesota has manufacturers of both solar thermal technologies.

What are the benefits of solar thermal energy?

Solar thermal energy is a renewable, sustainable energy source and can be a cost effective and reliable way to provide hot water and heat for buildings. Passive solar building design can make your building more comfortable. In addition, solar thermal is a strategy for addressing climate change, diversifying our energy supply, increasing Minnesota's energy independence, and boosting the state's economy.

Where should solar thermal systems be located?

Not every site is well suited for solar thermal applications. Still, solar thermal siting requirements are much more forgiving than those of solar electricity. Therefore, solar thermal is more versatile and appropriate for a greater number of locations. If you have a roof (for solar hot water) or vertical wall space (for solar air heat) with good southern exposure, free of trees, buildings and other shading, your site might be suited for a solar thermal installation. A more formal site assessment done by a solar professional can accurately determine the solar potential of your site.

How much do solar thermal systems cost?

In Minnesota, the installed cost of a solar hot water system is approximately \$10,000 - \$12,000 for a typical residential installation (before incentives). For a residential

system that combines both water and space heating, the range is \$20,000 - \$25,000 or more. Solar air heat installations for space heating start at \$5,000.

Energy efficient mortgage financing is one way to make a solar thermal system more affordable. Rolling the cost of the system into a mortgage alleviates the need for a large up-front expense and distributes the cost of the system over a number of years. The FHA 203(k) program enables a home buyer to obtain a single loan to finance both property purchase and complete major improvements (like a solar thermal system) after closing.

What incentives exist for solar thermal technologies?

There is a federal tax credit of 30% (no cap) of the cost of a residential or business solar thermal system (air or water) installed between January 1, 2009 and December 31, 2016. Specific equipment and systems may or may not be eligible for the federal tax incentives; details are available through the Internal Revenue Service. In addition, the state of Minnesota exempts solar equipment from sales and property tax. For a current list of government and utility incentives for solar thermal and other renewable energy technologies, visit the Database of State Incentives for Renewable Energy.



A solar air heat installation at the Little Earth Housing Development in Minneapolis.

(over)

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solar electric

What is solar electricity?

Solar electricity or photovoltaics is the use of sunlight to generate electricity. The process, although somewhat complicated, is familiar to most of us in the form of solar powered calculators which use small photovoltaic (PV) cells to power the device.

Does solar electricity make sense in Minnesota?

Virtually every region in the United States has sufficient solar energy to produce electricity from the sun, and Minnesota is no exception. Today, there are approximately 1,500 kilowatts of installed solar electric capacity in Minnesota. In 2008, the U.S. Department of Energy named Minneapolis-St. Paul as one of 25 Solar America Cities in their effort to deploy solar throughout Minnesota.

What are the benefits of solar electricity?

Solar electric systems have low maintenance and operating costs and can produce electricity for 30-50 years. Solar electric is a source of non-polluting power and helps mitigate climate change by reducing fossil fuel consumption. It also diversifies the energy supply and increases Minnesota's energy independence. Solar electric investment creates local jobs and stimulates the local economy, as well.

What are the challenges of solar electricity?

The single biggest barrier to solar electricity is the initial cost of installation. However, the costs of solar electric installations are expected to decline, perhaps by up to 50% by 2015. Siting a solar electric system can be a challenge since any shading from obstructions significantly reduces the system's performance. State law allows local zoning boards to create solar access easements to protect a property owner's solar investment

from shading caused by new development.

How much does solar PV cost?

The first step in a solar electric project is to implement efficiency and conservation measures to reduce overall energy use. Solar investment can be reduced by thousands of dollars for every 1,000 kWh load per year eliminated. The cost of a solar electric system varies with the size and type of system and available incentives. A typical 2

kW residential system (which might provide 2,400 kWh per year) costs about \$17,000-\$20,000 installed, before incentives.

What is the Minnesota Solar Rebate Program?

The Solar Electric Rebate Program was established in July 2002 to provide rebates for photovoltaic (solar electric) systems in Minnesota. The program offsets the cost of installing new qualified solar electric systems. To qualify, the application must be approved *prior* to starting installation. Funding availability for the rebates is determined by legislative allocations. Application and guidelines can be found at www.energy.mn.gov.

What other incentives exist for solar electricity?

There is a federal tax credit of 30% (no cap) of the cost of a residential or business solar electric system installed between January 1, 2009 and December 31, 2016. In addition, the state of Minnesota exempts solar equipment from sales and property tax. The Minnesota Housing Finance Agency also has loans available for energy improvements through their 'Fix-Up Fund' program. It is strongly recommended that eligibility for particular programs and systems be confirmed prior to any installation.

For more information...

To learn more about solar energy options, check out:

Database of State Incentives for Renewables and Efficiency: www.dsireusa.org

National Renewable Energy Laboratory: www.nrel.gov

Department of Energy: www.eere.doe.gov

Solar Rating and Certification Corporation: www.solar-rating.org

Minnesota Renewable Energy Society: www.mnrenewables.org

Minnesota Housing Finance Agency: www.mnhousing.gov

Internal Revenue Service: www.irs.gov

Office of Energy Security:

www.energy.mn.gov



A house in Finland, MN that has a solar electric system in the front yard which generates enough electricity to power most of the home's energy needs. The system is grid-connected and excess energy is sold back to the utility company.



A building integrated solar photovoltaic (BIPV) system installed in the skylights at the Marjorie McNeely Conservatory at Como Park in St. Paul, Minnesota.

